



this study. Among 36 cases 9 belonged to Stage II, 16 stage III and 11 stage IV. No patient of stage I has been found.

The serum PHI estimation was done according to Bodansky (2), by the method described in Sigma Technical Bulletin No. 650. The serum aldolase activity was determined by the method of Sibley and Lehninger (3) and Wolff *et al.* (7) described on the Sigma Bulletin No. 752. The serum hexokinase estimation was done by the method of Sols and Krane (5).

## RESULTS

Serum phosphohexose isomerase (PHI), aldolase (ALD) and hexokinase (HK) levels were determined in 25 normal healthy female subjects and 36 cases of carcinoma ovary. These cases were divided into the stages as described earlier using the criterion of International Federation of Obstetrics and Gynaecology.

Table I, illustrates the serum phosphohexose isomerase activity levels in controls and carcinoma ovary. Table II shows the serum aldolase activity levels in controls and carcinoma ovary and Table III shows the serum hexokinase activity levels in controls and carcinoma ovary. The activity of serum PHI, ALD and HK are expressed in Bodansky Units, Sigma Units/ml and *unit/mg* protein, respectively.

TABLE I : Serum PHI levels in carcinoma ovary before and after treatment.

Group	No. of cases	Before treatment Range (Mean $\pm$ SD) (B.U.)	No. of cases	After treatment Range (Mean $\pm$ SD)
Control	25	9-41 25.87 $\pm$ 9.87		—
<i>Carcinoma ovary</i>				
Stage II	9	30-75 54.25 $\pm$ 6.73***	7	15-40 27.13 $\pm$ 7.12
Stage III	16	63-107 80.61 $\pm$ 14.32***	13	27-94 76.44 $\pm$ 13.25
Stage IV	11	89-157 124.00 $\pm$ 27.65***	8	98-184 130.25 $\pm$ 28.75

\*\*\*P < .001

TABLE II : Serum ALD levels in carcinoma ovary before and after treatment.

Group	No. of cases	Before treatment Range (Mean $\pm$ SD) Su/ml	No. of cases	After treatment Range (Mean $\pm$ SD)
Control	25	2.2-9.2 6.44 $\pm$ 2.05	—	—
<i>Carcinoma ovary</i>				
Stage II	9	3.4-15.5 7.04 $\pm$ 1.83	7	3.1-9.1 6.94 $\pm$ 2.25
Stage III	16	4.9-30.4 16.7 $\pm$ 2.83***	13	4.6-28.2 17.32 $\pm$ 2.53
Stage IV	11	4.6-28.6 18.01 $\pm$ 3.57***	8	6.8-31.9 20.25 $\pm$ 3.6

\*\*\*P < .001

TABLE III : Serum HK levels in carcinoma ovary before and after treatment.

Group	No. of cases	Before treatment Range (Mean $\pm$ S.D.) (Unit/mgP)	No. of cases	After treatment Range (Mean $\pm$ S.D.)
Control	25	5.2-13.2 9.43 $\pm$ 2.24	—	—
<i>Carcinoma ovary</i>				
Stage II	9	7.8-20.4 15.37 $\pm$ 5.14***	7	7.2-12.4 9.15 $\pm$ 1.86
Stage III	16	8.5-27.2 18.62 $\pm$ 6.21***	13	8.6-26.1 17.55 $\pm$ 6.83
Stage IV	11	10.1-30.6 21.34 $\pm$ 8.93***	8	9.4-26.6 20.63 $\pm$ 8.25

\*\*\*P < .001

## DISCUSSION

*Serum PHI* : Serum PHI activity was diagnostic in 7 out of 9 cases in stage II and in all the cases in stage III and IV. Comparatively lower values of this enzyme were observed in stage II and the highest in stage IV.

The elevated level of serum PHI came to normal limits after six months treatment in all the cases of stage II. In stage III, only one patient, showed normal values, while rest of the cases showed significantly elevated levels of the enzyme. In stage IV patients the levels remained significantly elevated due to the worsening conditions of the patients. These results could not be correlated due to absence of similar data.

*Serum ALD* : Serum ALD activity was diagnostic in 4 out of 9 cases in stage-II, 11 out of 16 cases in stage III and 9 out of 11 cases in stage IV. No correlation of enzyme activity and clinical stage had been observed. These results could not be correlated due to the absence of similar data.

All the stage II patients showed normal levels of this enzyme after effective treatment. In stage III, enzyme levels remained elevated, except in few cases. While stage IV patients, due to worsening condition showed significantly high enzyme levels.

*Serum HK* : Serum HK activity was diagnostic in 7 out of 9 cases in stage II, 12 out of 16 cases in stage III and 9 out of 11 cases in stage IV.

The elevated level of this enzyme came to normal after six months treatment in all the cases of stage II. In stage III, enzyme levels remained high throughout the study except in four cases. In stage IV, the enzyme level remained elevated throughout study with slight variations. These observations also could not be correlated due to the absence of similar data.

Thus the level of PHI in serum in carcinoma ovary may be monitored with treatment and so it could be used as an adjunct to histopathological diagnosis. All the three enzymes studied correlated well with the clinical stage of the disease.

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